

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1694.—VOL. XXXVIII.

LONDON, SATURDAY, FEBRUARY 8, 1868.

{ STAMPED .. SIXPENCE.
{ UNSTAMPED, FIVEPENCE.

Original Correspondence.

THE ACCIDENT AT THE OAKS COLLIERY.

SIR,—Having noticed in the Journal of Jan. 25 a paragraph stating that the engineers in charge and the workmen have been at issue, and that, consequently, but little progress has been made, I beg to state that such a report is entirely without foundation.

There has been no dispute whatever with the workmen since the re-opening of the pits commenced, and we have now many more applicants for work than we have room for.

The progress made has been quite as satisfactory and rapid as is consistent with safety; and I should recommend your correspondent to ascertain the facts before making statements which cannot be substantiated. By inserting this in your next issue you will much oblige.
Oaks Colliery, near Barnsley, Jan. 31. JOHN E. MAMMATT.

COAL MINING IN THE FOREST OF DEAN—No. I.

INFLOW OF WATER FROM THE RIVER WYE.

SIR,—Your correspondent, "J. G.," who wrote a long letter in the Journal of Jan. 18, is not the only person who noticed a report in the Mining Journal of September last, which stated that the flow of water from the River Wye came into the new pits in progress of sinking, and belonging to the New Bowson, or Great Western Colliery Company, Forest of Dean. However, unlike "J. G.," we are compelled, for the sake of truth and the benefit of the mining public, to take a stand against the assertions and opinions of wild theorists and persons who too frequently write about matters they do not understand, and with which they have not the least connection whatever. I would ask any practical man, well acquainted with the Forest district, whether engineer or geologist, how the coal seams can in any way be affected by the water from the River Wye? We know for a certainty that the formation of the strata outside the coal measures is of such a character as to render it quite impossible for water from such a source to percolate through them. On looking over the geological map of this district, constructed from the Geological Survey of Great Britain, we find the distance from the Bowson pits to the out-croppings of the coal field nearest to the River Wye to be nearly three miles; and from the outside edge of the coal field to the river nearly half a mile. The whole of the latter distance is occupied by the mountain limestone, sandstone, conglomerate, and the various beds or veins of argillaceous substances, such as clay and shale, which are alternately found between the beds of the rock in this district. More especially do these stiff beds of clay and shale occur under the deepest coal beds—"the Trenchard and Coleford High Delf veins," the latter of which is being sunk for by the Bowson Company. From the River Wye, near the junction of the Lydbrook Valley, to the top of the Arthur and Edward Collieries, there is a rise of ground of nearly 73 yards; and from the latter to the top of the pit at Bowson Colliery there is still a further rise of about 79 yards. The latter pit is, therefore, 152 yards above, and its bottom 132 yards below, the surface of the water in the river; and this fall, on a distance of three and a half miles, would give a gradient of 1 in 140, or 4714 ft. per chain. We have, therefore, the water in a very shallow river—not 15 ft. deep in the winter season, and hardly half a chain wide—pressing against three and a half miles of limestone and sandstone strata, different beds of clay intervening.

Now, in the face of all these facts, what sane man would, even among private friends, advance opinions such as those reported in the Journal of September last, and reiterated by such gentry as your correspondent, "J. G."? Such assertions are not only calculated to deceive and mislead the public, but, being untrue in themselves, do a real and lasting injury to the mining interests of the districts. If persons send forth such opinions as facts to the world, and at the same time know they are false, then they are wilful deceivers and unworthy of public confidence, and must, of course, abide the consequences; and if they do so in utter ignorance of the principles involved in the subject which they attempt to handle, they should remain at their own level and learn the first rudiments of all sciences—fundamental truths.

Feb. 5.

COLLIERY EXPLOSIONS, AND SAFETY CAUTIONS FOR LAMPS.

SIR,—Will you kindly permit me to bring before your notice, and thus the public also, a proposition, having for its object the protection of life and property in coal mines? In reading the accounts of the fatal sacrifice of human life which of late has unhappily occurred, not but be impressed with the idea that there exists among colliers many who are very ignorant, careless, or reckless of their own and their fellow-workmen's lives. I refer to the continual reports recorded of open lamps having been used, and explosions caused thereby. Most safety-lamps are, I believe, locked before they are handed to the men upon descending the pits, but it has been found that these locks in many cases can be opened by some simple contrivance, and men have been known to provide themselves with keys for the purpose of tampering with the locks, and have thus obtained what they desired, (say) a better light, or a smoke from their pipes. The men are, doubtless, continually being cautioned verbally not to do this, and the Government rules attach penalties for such conduct. Now, I think what is required, and I believe it is the general opinion of those who have charge of the men, is to impress upon the collier a true conviction of the value of the safety-lamp, and the danger of tampering with it. It would be impracticable to take the colliers and put them to school, and thus educate them (I mean those who come under the heading of ignorant, careless, and reckless), but we must take them at present as we find them, and meet the difficulty in some more immediately practicable form. It was while reading of the Ferndale explosion that the following idea suggested itself to my mind. Why should not the safety-lamp be provided with a caution? which would possibly, and I think very probably, deter a man from committing these branches of the rules. Say an indestructible enamelled tablet, bearing such a caution as the following:—

DEATH IS NEAR!
DON'T OPEN YOUR LAMP!

Or any other inscription in English or Welsh which might be determined on by the proprietor; this tablet to be then soldered firmly to the body of the lamp. It is not possible to say what good such a thing might do, but I think it will be admitted (and I have taken the opi-

nion of many who have the overlooking of the men, and also of the men themselves, who agree with me) that the master would be taking a step in the right direction by adopting it. I have communicated my ideas to Messrs. J. Willing and Co., 70, St. Martin's-lane, London, the makers of Baugh's patent enamelled iron tablets, and have been furnished with samples and particulars as to cost, and I find that for a matter of a few pence per tablet every lamp may have a "safety caution." The applying of the tablets need not interfere with the working of the pits, as the tablets could be soldered on the lamps at the colliery, a few only every day if necessary. R. DUNLOP.

Cwm Avon, Port Talbot, Glamorganshire, Feb. 3.

IRON PYRITES.

SIR,—As the certainty of an unlimited supply of cheap pyrites has become a question of great importance to the sulphuric acid manufacturers of this country, would you allow me to state, in reference to the letter of Mr. F. T. Barry (Jan. 15), that about the year 1840, or so, the sulphur question with Brazils filled the minds of those connected with chemical science to a great extent, as to where and how to get a supply for our necessary wants. The bottom vein of coal in the South Staffordshire basin contains pyrites in and about it to a considerable extent, and, by chemical report, that vein, though a thin one, was the most valuable in the whole coal field, and stated, in the Birmingham newspapers at that time, to contain so much sulphur as to be worth 37. per ton. At that time I was silent respecting the sulphur trade, hoping it would be entirely stopped or cut off, as I had in my possession a soft rock of a light colour about 8 yards in thickness (and in some places on the surface), in Gloucestershire, which contains sulphur, or brimstone, enough for this nation for ages, want what it may. Much of it is in nodules the size of large pin-heads, and as pure to the eye as gold nuggets. It comes to surface gradually, and, by geological tracing, seems to continue to dip in the same direction about 10 miles in distance, at which place I calculate it to be full 300 yards deep from surface, and continues of great spread in width, with both water and railway facilities at hand. Gold here is recognisable, of which more anon. The whole of the rock alluded to for mineral acid would work to good advantage for acid colours and other advantageous ends, either in close oven-like retorts or kilns. It may not be amiss to state that about the year 1808 only I became acquainted with the noted Mr. Samuel Baldwin Rogers, analytical and practical chemist, at his laboratory, Pontypool (since of Nant-y-Glo and Newport). He was the first man known to construct ovens for coking purposes, making coke from fine slack, also for the purpose of distilling coal for its produce, making the first English naphtha, ammonia, salts, &c., and from whom came the practical manufacture of gas into operation. He did, at considerable expense to himself, erect a retort at the end of Chepstow Bridge, and with tin piping and burning jets, about every 3 or 6 ft., on both sides, all round, illuminated the said bridge. Gentlemen from all parts, from notices in different newspapers, attended the experiment, and were so highly satisfied with the result, coupled with Mr. Rogers's explanations of the great good derivable, that a conclusion was at once come to for the erection of gasworks at Bristol, but before Bristol Gasworks were finished the London City Gas Company was formed by Messrs. Flynn, Sparrow, and Co., so that Bristol was the first to erect works to support a gasometer. Chepstow Bridge divides the counties of Gloucester and Monmouth; and so enlightened were all parties at that time that on both sides the bridge, English and Welsh, said that without the assistance of his Satanic Majesty Mr. Rogers could not have performed such a miraculous feat. I remained manager with Mr. Rogers to the year 1817, at which laboratory were brought to perfection, and manufactured from coal, minerals, and vegetation, the following articles:—from wood, charcoal; by distillation, pyrolitic acid, crystal of lime, &c., for the Manchester trade; from coal, coke, coal-tar, pitch, asphaltum, creosote, naphtha, mineral oil, varnishes of various sorts, and ammonia brought to perfection in many different ways—from pyrites and sulphur, oil of vitriol, aquafortis, &c., mineral acid in vast quantities, alum, saltpetre, with colours of various description and sorts, &c., too numerous to mention. All going on most prosperous until, by a contrary, untoward event in the working of his lease, under the then Pontypool Company, consisting of Messrs. Hanbury Leigh, Smith, and Watkin Gurge, stating that they agreed to serve him with small coal, all required, at 5s. per ton, but went on to say that if they did not choose to serve him no one else should (this latter was not noticed by Mr. Rogers); they could not, or would not, supply him with sufficient to keep the works on, so that part of the works were idle for want of coal. I was requested to go and buy 500 tons of small coal to go on with. When, at once, Capt. Smith, brought up to the law, took advantage of the wording of the lease (which was a plot of his), and sued for forfeiture. At the same time, Mr. Rogers had just laid out, for vitriol and mineral acid department, several thousand pounds in lead only, besides walling in the works, 140 yards square, with 12 gates of iron. The law went on, followed at same time by the first panic after peace, which took place in 1817, and poor Mr. Rogers was ruined. This being a private works, and known only to Mr. Rogers and myself, Capt. Smith and the company offered me 365 guineas yearly, house and land, to manage this said works, which, for his treatment to Mr. Rogers, I refused, and the works gradually went to nothing, and soon disappeared; both Smith and Watkin Gurge died, and nothing appeared to prosper with any of them concerned. Poor Mr. Rogers lived to see the end of them all, but they had so completely ruined him that he was never able to recover himself again, and died some short time ago. He was a most proficient man in the manufacture of iron, and, in connection with myself at Cleve Hill Ironworks, Shropshire, has done more in the improvement in iron than almost any others, as what he dared not carry out in Wales I perfected at Cleve Hills.

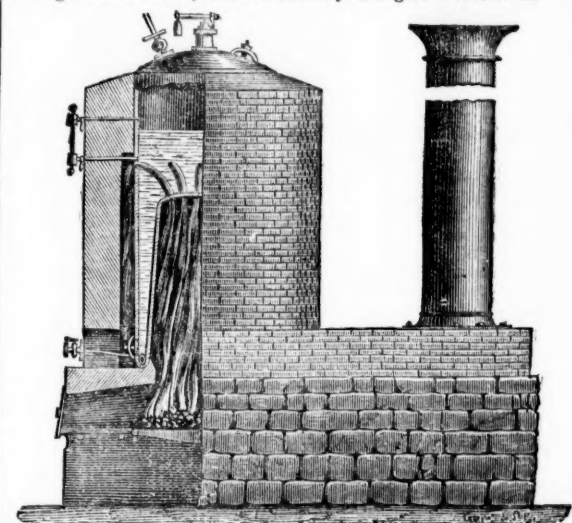
Mr. Rogers, instead of sand-bottoms, first introduced iron-bottoms for puddling-furnaces, also introduced the method of pig-boiling, instead of refined metal, under a pledge from both him and the ironmasters for a rise in wages per ton, according to labour and yield. When accomplished and established, to the disappointment of Mr. Rogers, the ironmasters broke word and dropped the price again for pig-boiling down to that of puddling refined metal. After which the Welsh iron-workers not allowing Mr. Rogers to make further improvements in Nant-y-Glo and elsewhere in Wales, was the cause of my working in conjunction with him at Cleve Hill, and where I carried out the only proper system of working blackband without the use of blast; also the proper method of manufacturing the New Zealand

iron-sand, and making the best charcoal iron yet produced, and at less cost, if the sand can be delivered at 20s. per ton.

JOSEPH GEORGE.

IMPROVED STEAM GENERATOR.

SIR,—I herewith forward you an engraving of a new system of boiler, invented by Mr. Vianne, C.E., of 24, rue des Grands Augustins, which he states to be economical, inextinguishable, and capable of consuming its own smoke, and will thank you to give it insertion.



In the figure a portion is represented in section, and shows the disposition of the interior, which is composed of a double-bottomed boiler. The fire-box is placed in the interior, and the flame is divided into twelve branches, or tubular flues of copper, which conduct the flame through the water, and afterwards round the outside of the boiler, thus offering a heating surface of 162 square feet per horse power. A man-hole, safety-valve, water-gauge, and blow-off cock complete the boiler. The principal advantages presented by this new generator are economy in the first cost of the machine, the small space it occupies, also a saving in the working expenses of 30 to 35 per cent. The heating surface being divided into tubes inside, it is comparatively free from the risk of explosions.

C. H. D.

Paris, Jan. 27.

STEAM ON COMMON ROADS.

SIR,—In many cases they have tried to imitate in France what is done on the other side of the Channel, without calculating whether the requirements were on equal conditions, or whether the English system would suit the French people; this is the cause of the little advancement of this question in that country. The English employ steam on common roads only for heavy traction, to draw heavy charges by means of ponderous engines moving at a slow pace, from 3½ to 4½ miles an hour. In France the requirements are different; in general they have no ponderous goods to be removed, but, on the other hand, they require more facilities for the transport of travellers and, above all, for the conveyance of small parcels furnished by commerce under the designation of "messageries." They, therefore, want light engines capable of attaining a higher speed. This is what Mr. Larmenjat has accomplished in the most simple and complete manner, by the provision of two small driving inside the larger driving wheels, so that the force of traction can be immensely increased at any moment. This substitution of one pair of wheels for the other is effected without stopping the engine, by a very simple mechanism, and does not require a minute. One can understand that with one of these engines we can attain on common roads a velocity of 7 to 10 miles an hour with a load; if at a given moment we can reduce the velocity of the engine from 10 to 2½ miles an hour, still keeping up the velocity of the piston, its power will be increased fourfold. This is done by lowering the inner driving wheels, and raising the outer ones from the ground.

As a first essay, the machine which worked at the Exhibition, of 3-horse power, started from the Auxerre station with a heavy lorry, carrying a load of 1½ ton, also containing 27 persons, in all 3 tons of load, without counting the weight of the lorry; with this it entered into Auxerre by the Porte du Temple, climbing up a long inclination of 1 in 12½, by means of the small wheels; the mean velocity, going and returning, was 5 miles an hour. The engine then made a trip of 65 miles, drawing a diligence containing 15 persons. The road from Auxerre to Avallon presents slopes of 1 in 33½ to 1 in 20, and although this was the first trip on a long journey, and no extraordinary dispositions had been made, the distance was travelled at an average rate of 6½ miles an hour. This service, by horse traction, costs for horses, relays, postillions, and conductors 70 frs. By the engine, we have 430 kilogs. of coal at 3 frs., 12 frs. 90 c.; one conductor, 3 frs.; one mechanic, 4 frs.; oil, 1 fr. 10 c.—21 frs. Difference in favour of the steam 49 frs., or 70 per cent. On arriving at Paris the engine started from the Lyons station, along the exterior boulevards; and, after having travelled over about 7 miles of road, part of which was in a very bad state, it entered the Exhibition premises at Boulogne, St. Cloud, and Billancourt, ascending the steep incline of Trocadero.

The road-engine of Mr. Larmenjat is distinguished from other traction-engines by the general disposition of its parts, its size, and weight. The English engines weigh about 1½ ton per horse-power, while that of Larmenjat weighs less than 1 ton per horse-power. It has two cylinders, with reversing gear: the crank-shaft communicates directly, by means of a pinion, with the axle of the driving-wheels; it carries two independent pinions, so that if one of the gearings gave way the other would be ready to work. Also, and this is the best part of the system, the two smaller wheels above mentioned, of a less diameter than the ordinary driving-wheels of the engine, fixed on the same shaft, are placed under the machine. They are manu-

vred with the greatest ease by means of a lever moved by a screw, and are set in motion by a belt-chain. These wheels are the additional "horses" put on, when necessary, to climb up or descend steep inclines or bad roads. Mr. Larmenjat constructs machines of 2-horse power for small private service, 4-horse power for those transporting 3 or 4 tons with a velocity of seven miles, from 8 to 12-horse power for great services of passenger and goods traffic, transporting easily 15 tons with a velocity of five to six miles an hour.

On Saturday, Oct. 19 last, in presence of the Prince Napoleon, a very interesting and important experiment took place on the traction of carriages by steam-engines on common roads. The new company of the Steam Messageries took one of their small locomotives, the *Larmenjat*, of 2½-horse power, coupled to a carriage containing 26 persons, among whom were the Prince Napoleon, accompanied by Admiral de la Roncière de Noury and M. Villot, orderly officer; the Baron de Vincent, senator, director of the Steam Messageries Company, and a number of visitors, who took place inside and outside. Starting from the southern entrance of the Exhibition building, at the Ecole Militaire, it proceeded rapidly down the avenue de La Bourdonnaye, crossed the river, and arrived at the Quai de Billy, opposite the Chaillot Waterworks. Thence it commenced upon the bold attempt to ascend the heights of Trosadero, by the avenue which leads directly to the Place du Roi de Rome, the gradients of which are 1 in 14.5 and 1 in 12.5. This was easily done, and the train started again, after arriving at the summit, at the rate of 7½ miles an hour, following the Avenue de l'Empereur as far as the La Muette entrance to the Bois de Boulogne, which it entered, and where it outstripped all the carriages. The "Bois" being crowded with vehicles, the little engine dodged them with wonderful vivacity, cabs and all; then made the tour of a great many turns near the lake, describing circles less than 15 feet radius. On returning down the heavy incline it had mounted the control was perfect over the velocity of 7.2 miles an hour. The whole time of the experiment was an hour. On arriving at the quay from which the Prince started, he warmly congratulated the Baron de Vincent on the success of the experiment, and did not forget to notice M. Sersel, the engineer of the Steam Messageries Company, who had carried on the experiment without the slightest hitch or accident of any sort. We heartily wish this company success in solving a problem of locomotion by steam for passenger carriages on common roads. In England it is not new; witness the long trips taken by the Duke of Sutherland and many others. Yet, these are isolated cases, and not at all resembling the feat of organising a regular service for public traffic over the whole of France. It will be a great boon to those villages situated 20, 30, or 50 miles from a station, to have a ready organisation of these homely branch lines, serving also as feeders to the general network of railway companies.—*Paris, Jan. 27.* C. H. D.

THE PROGRESS OF MINING—AS A SCIENCE, AND SOURCE OF COMMERCIAL WEALTH.

SIR.—The new channels of investment projected and offered to the consideration of the public show that attention is now seriously directed to the gold and silver mines of the New World and Australia; not that the home mines are neglected, for some of those are still being brought before the world with promise of a favourable reception. Of course, if mining would preserve its high position in the commerce of the world, new undertakings from time to time must be instituted, and it is curious to mark the change in ideas with respect to them. A great deal of information has recently been brought to bear upon the mines in that great chain of mountains running from north to south, completely through the great continents of America—the Andes. We have also a great deal of new intelligence as to the gold mines of Australia. The accounts of the crests of the great gold and silver lodes that traverse Sierra Nevada, in California, and the adjoining provinces, show that the very outcroppings of those lodes contain an amount of gold and silver, the mere surface workings of which in five or six years have sufficed to build cities of 15,000 inhabitants, and to establish a population and state of intercommunication equal, if not superior, to many old-established provinces. Seeing the great riches of those lodes, it is not to be wondered at that capitalists are beginning to prick up their ears, and to talk of giving those marvellous El Dorados a fair trial. Consequently we have several prospectuses, some of which are well supported by some great smelters, and others for forming companies for working and bringing home the precious metals. Since the laying down of the electric cable across the Atlantic these far-off lands can be communicated with from England in a single day. There are gentlemen amongst us enjoying from 20,000l. to 30,000l. a year each in dividends from some of these mines; so that these schemes are not so far-fetched, or Eutopian, as they might at first seem. The mines are exceedingly well described, and excellent maps bring a country before us that was a short time ago a terra incognita; and there really now seems nothing Quixotic in expecting to get profits corresponding to the quantity of precious metals in those famous veins; and, after the present apathy has passed away, we need not be surprised at seeing a goodly portion of our mining capital passing westward to those hitherto unknown but evidently splendid fields of enterprise. Another great district has been brought before us, showing peculiar qualities as to the yield of gold. The province of Victoria has been proved to yield gold in the great gold reefs from 70 to 100 fms. from the surface; and there appears to be no indication of the treasures falling off in depth; but, on the contrary, the lodes seem to become more thickly interspersed with gold, and the produce and profits increasing with depth.

There can be little doubt that the new gold fields of Nevada, Colorado, Idaho, California, of Victoria and other provinces of Australia, will this year begin to claim strongly the attention of our mining capitalists; but for other speculators, who wish to invest in things nearer home, there are signs of the times that their wants will be properly catered for. As an instance of evidently well-selected ground, I might call attention to an extensive new copper mine about to be worked in the neighbourhood of, and adjoining, the Devon Great Consols. Whoever will take the trouble to look at the mines associated with this project, and the information contained in the prospectus, may see that there are *bona fides* about it that separate it far from the ephemeral undertakings of the day; and those who wish to see mining revived under healthful auspices would do well to give such works their support, as they not only bid fair to pay well for all the outlay required, but also to find work for an industrious and trained population of suffering people. There is a great difference between entering into indiscriminate mining adventure, bearing the aspect of wild speculation on the face of it, and those properly reported undertakings which show on their faces the evidence of careful selection, and serious determination as to the results to be achieved. I also notice, amongst other things about to be introduced to the world, some very valuable ground in Cardiganshire for mining. In noticing the progress of mining, I have from time to time called attention to the marked rapid advance in prosperity of the best mines in Cardiganshire. This is not a myth or a story that cannot be substantiated, but really a subject of great importance. Almost all the young mines to the east of Aberystwith have this year become profitable, and of many of these mines two years ago it would not have been safe to prognosticate that they would struggle through the incipient difficulties of mining. I may mention Bronllyd, South Darren, Bwlch Consols, Powell United, Llwynog, Bwadrain, Plynlimmon Consols, and others, as specimens of what I mean.

There is now a comparatively new district between the old silver mining district of Goginan and the Plynlimmon mines, into which the lodes of the Great Cwmymlog Darren, Cwm Erfin, and Goginan pass; lodes that are now returning scores of thousands of pounds worth of lead and silver per annum, and making large profits, which are likely to be opened up in a mining like manner. There are many grants, mostly from the Crown, and they appear to me to offer a very legitimate field for investments in home mining. I believe Nant-y-Mwyn is about the centre of this ground, and the outlying skirts, north and south, extend to Dylife, making 20,000l. a year, and Cwmymlog making very good dividends. I do not see how mining can fail to be remunerative, if districts like these are properly worked. I have seen a prospectus of the old Grogwinion Mine, a mine in the midst of the Lisburne district now offered to the investing public. This old mine made fortunes for the old race of miners, amongst whom Sir Thomas Bonsall stood prominent, but its chief recommendation is that it is an adit level mine. The deep adit driven across the country

a quarter of a mile and upwards to the lode taps it at a depth of 600 feet, and then goes under rich and productive old workings with backs of the whole ground of from 20 to 70 fathoms high. Such are a few of the things now offering to the discernment of the public. I think none of them are marked by the reckless statement that inaugurated projects of bygone times of mania, and no doubt the public will be more prudent in making their elections with the history of past disasters before them; but it is equally unwise to reject everything without giving it a fair scrutiny, as it is to accept all presented. It is to be hoped when the annals of the future come to be written that they will form a better story than that attached to mining speculation for the last year or two. M. F.

MINING IN CORNWALL AND DEVON.

SIR.—In the year 1720 a rich lode of copper was discovered by a few poor men, driving an adit, or day level, a distance of some 400 yards into a hill, about a mile from the ancient town of Marazion. This enterprise took about seven years to accomplish, as these men could only work during their spare hours from their pursuits, being occupied principally in fishing and tin streaming for their livelihood. The result was that shares purchased for a pot of beer each rose to be worth 1000l. per share, owing to an immense discovery of ore. One man became a baronet and a Member of Parliament, representing the county of Cornwall 25 years. The grandson is the present Sir Charles Lemon, Bart., residing at that splendid domain, Carlew Estate, near Falmouth. Subsequently the Old Prosper Mine was discovered on the same lode, then in a few years Trevarthen Downs Mine, Kistal Mine, Penberthy Crofts Mines, Wheal Friendship (St. Hilary), Wheal Virgin, and Great Godolphin, all on the same lode, and yielded at the then low price of copper about 8,000,000l. sterling. Subsequently the Alfred Copper Mine was discovered, a little to the north, which produced about 1000 tons copper ore monthly for about 15 years. Subsequently Alfred Consols Mine was discovered on the same lode, a little to the east, which paid a clear profit of 99,860l. in seven years, after paying back the outlay originally invested—12,000l. To the south of these mines is a circumference of about three miles; the parallel lodes, five in number, have produced tin and copper ores to the extent of several millions of money. The Prosper United Mines are situated in the same valley, and near the old Owen Vean Mine, the richest mine formerly ever known in Cornwall, at the period of its first working, from the immense quantity of tin found near the surface—for 30 yards wide—called the Pryor deposit, which was nothing less than a mountain of tin submerged, and the first code of Stannary laws ever framed in Cornwall was in the year 600, specially to regulate the rent or dues payable to the landowners, in this mine of wealth a dish or dole of 1-6th part.

Subsequently the Owen Vean Mine was one of the richest copper mines in Cornwall for many years, and this lode, south of the great tin deposit, or quarry of tin, became a very rich copper mine, the same lode yielding immense returns of copper ores for several miles east and west of this celebrated old mine, and gave employment to thousands of persons for upwards of 50 years. Several mines were afterwards discovered a little to the south, which have only been partially wrought—Wheal Lovell, Caroline, Neptune, Trenow Consols, and several other mines of less note. Some of these mines yielded the richest sulphur of yellow ore in Cornwall. Thousands of tons fetched, at the ticketings, from these mines, from 15l. to 30l. per ton. Subsequently a little mine was discovered in the year 1858, with an outlay of a few hundred pounds, that yielded ores worth at times above 30l. per ton; but the stopping of the run of mines to the east of this mine flooded this new mine during the early part of 1866, just as the company was approaching the supposed great deposit of minerals. This mine was called after the ancient manor, Tolvadden. The celebrated Wheal Vor district for the immense deposits of this metal, produced from time immemorial, is a short distance of about 30 miles from this basin, geographically speaking. And the Lelant district, a little to the north-west of the same basin, has also been immensely productive of tin ore for generations past, and still yielding large returns annually of this metal. The price of tin and copper fell from 30 to 40 per cent. during the recent commercial panic, and for a time caused many very promising mines to be suspended; in fact, almost every tin and copper mine in Devon and Cornwall that would not meet the cost was suspended, and when trade again revives, mines no doubt, will pay as well as ever. AN ADVENTURER IN MINES. Feb. 6.

MINING, AND SHARE DEALING.

SIR.—Some recent correspondence with those who have been "bitten," and also with others who have not been "bitten," is suggestive of new reflections on several well-worn points. Take the question of the condition of mining interests. Well, what may be said of it that has not been said ad nauseam? There is this additional, that a dozen or any number of country letters may be sorted into two classes; into the class content and the class non-content. And at the outset it may be remarked that those who have taken their information from your columns will, as a rule, be found with the former, while those who have gone over to the doctrinaires are as ill-pleased as the old gentleman with the ass that he led, that he rode on, that he carried, and that he lost eventually in the river. The contents bought well; not lower certainly than they might buy to-day; but what, perhaps, is of more importance, that which they did buy was worth buying. It was a reality, something not of the imagination, not of the inventive genius of a knave, or of a clique of knaves. To-day they might take the train to Cornwall to look at it, to inspect it, to offer suggestions regarding it. Or at home they might indulge in substantial dreams respecting it; of the future when present gloom shall be succeeded by bright sunshine. The non-contents bought badly; some befuddled shadows, some marvels, some catch-pennies as base as the bills of exchange now choking the discount market, although offered at 25 per cent. of their face. The mining interests of the non-contents are a disappointment, a vexation of the flesh and spirit, an unmitigated and disgusting—swindle. Confronting one of the letters of the class requires fortitude; a personal encounter would demand the exercise of an even stouter virtue. The class is to be pitied, the rogues who let them in exonerated. Robbery on the highway is honourable when contrasted with the trap-setting devices of modern times; for on the highway the watch and purse are taken, but under cover of incorporation or association all that a man or woman has may be spirited away. The robber appropriated that which his victim could part with and not feel poorer; the fraudulent concocter it so devoid of conscience that, Nero like, he rejoices at the exhibition of the utmost wickedness that he can do.

Were, therefore, mining interests dependent on holders who bought well there would be little to complain of, but, being prejudiced by the acts of designing men, why there is the depression, the stagnation that is so irksome to well-meaning people. The revelations about the disreputable class are startling, brazen-faced. The class have their circulars, their selections, their recommendations. Perhaps they are the identical persons who prophecy in racing matters, foretell events, name the winners, and execute commissions at the post. Their personal execution at the post would be a good riddance. To the names of the disreputable class there is the cheap appendage of mining agent; but being personally unknown at the Mining Exchange why, presumably, their principals are in the clouds. Presumably, they represent unknown persons and unknown possessions; presumably, their adits are their circulars and their prospectuses, their lodes the purses and the cheque-books of their victims. Really, they are the mock-auction fellows of mining and sharedealing, the short-measure fellows of the cotton-real trade, the appropriators of empty labelled Bass' and Allsops' beer bottles. The disreputable class are as deserving of avoidance as certain business firms, whose designation may be mistaken for that of another of high commercial standing. But in seeking to avoid one mistake another should not be committed. There are many trustworthy circulars sent out, some by well known members of the Mining Exchange, others by less known men, but whose circulars, nevertheless, are, in their way, models of painstaking accuracy and praiseworthy zeal. Such circulars are useful—well calculated to arouse attention to the sterling claims of British mining. But with good and bad circulars brought from the postman to the breakfast table, what choice shall the investor make? To what test shall he submit circulars, unless to the woeful one of risking money? As before remarked, a responsible weekly journal is incomparably

the best medium. There opinions are put forward which others may question or disprove. There all important information commands space, whether it may be favourable or adverse to individual interests; there, finally, may be found the ungarbled, actual dealings at the Mining Exchange.

One point more. It is an easy effort to be put in the way of good things in mines; quite as easy as to be put in the way of bad things. First consult the *Mining Journal*, the chief mining publication. There investments speak for themselves. Of choice there is no lack, the bill of fare being more varied than the best City luncheon room offers. Let the investor make his notes, and with them in his hand, or before him, what next but to communicate with a trustworthy agent. There will then be a comparison of notes, and thus appealed to no honourable man would lead another man astray.

"What think you of So-and-so? Is it the right sort of thing for 10l. or for 100l.?"—"No; not exactly."

"Well, what is there that is better?"—"There is this, that, and the other thing. I pledge you my reputation they will not deceive you." This really is what mining and sharedealing should be, while about them there is often too much of the patent medicine testimonial style of business. The recommendation of Parr's pills is that old Parr attained to more years than other people. In mining, likewise, age is a great card. The manner of business needs reform; should, in fact, be reformed before there is any revival of activity in mining. Investors should seek out good men to buy for them, and having found them they should stick to them. There should be references, equally on the agents' part as on the investors' part; and as a trustworthy agent would not care to buy without reference so, unless reference were forthcoming, no unknown and untried agent should be trusted to the extent of the sale or purchase of a single share. Nor for the transaction of business on such terms need apprehension be entertained, as mining agents who are members of the Mining Exchange must conform to even more exacting rules in the transaction of their only business. The Mining Exchange has a most admirable code of rules, which, if as well circulated as deceptive statements, would favourably impress the general public with the character of those with whom, if they please, they may deal hereafter.—3, Great St. Helen's, London, Feb. 6. CHARLES THOMAS.

MINING ENTERPRISE IN NOVA SCOTIA.

SIR.—Allow me to resume my too long interrupted observations upon the mineral resources of Nova Scotia, and the progress of mining enterprise in this province. I will confine this letter to the gold mining developments of the past year.

The statistics of our gold mines for the fiscal year ending Sept. 30, 1867, have just been placed before the public, so that we have all the materials which official returns can afford us for arriving at a correct conclusion as to what has been done in mining, and what gold has been produced during that period. You may possibly not remember that, according to the law of Nova Scotia relative to gold mines, every lessee of a gold mine is required, every three months, to make and file in the head office of the Mines Department a sworn return, showing, amongst other things, the number of days' work expended by him, the quantity of quartz extracted by him, and the amount of gold obtained from it, or from alluvial mines, during the preceding quarter; and that, in like manner, every quartz millowner must file in the same office sworn monthly returns, showing the amount of quartz crushed, specifying the mine, or several mines, from which it was produced, and the quantity of gold, smelted or unsmelted, yielded by each lot of quartz so crushed during the preceding month. Upon this return the millowner pays over to the Department the royalty—2½ per cent.—which he is required to have retained out of each "grist." Thus these returns may be considered reliable, and may be considered to represent all the gold produced by the mines, except what is pilfered from the lessees themselves. To what extent this pilfering is carried on we have no means of knowing, but it is needless to connive at the fact that, in some districts, the apprehensions on this score have become so serious that not only will lessees have to increase their vigilance, but the Provincial Legislature must, of necessity and immediately, enact some stringent regulations to facilitate the apprehension and due punishment of offenders.

There is good reason to believe, I cannot but think, that the vigour, activity, and magnitude of mining operations in Nova Scotia, during the past year, have not been so great as they would have been had it not been owing to the following causes:—Owing to the great political change in the relations of the country, consequent upon the union of these North American colonies, just consummated, and the consequent and almost fiercely contested Parliamentary elections, the past season has been of quite unprecedented political excitement in Nova Scotia; and this excitement has tended to withhold the public attention from mining, as from many other commercial enterprises. A much more important and more keenly felt cause of retardation is a wide-spread commercial depression. It is useless for me here to discuss the causes of this, but the fact is undeniable that not for about 20 years past has the tightness of money, and the general commercial depression, been so great in Nova Scotia as it is at the present time; indeed, gold mining is almost the only branch of business in which this depression is not obvious; but, although this is not obvious there, I cannot but think that the results of the year's mining operations would have been more satisfactory had it not been for these causes. Fortunately, one of these can now scarcely be said any longer to exist, and we are not without good reason to believe that the other will soon cease to make itself felt.

Even if we make no allowance for depressing influences, the results of last year's gold mining must be considered satisfactory. These results show an increased aggregate productiveness, and, what is more important, an unquestionable advance in the profits of those who have invested in mining. This, as well as the progressive productiveness of our gold mines since they first commenced to be methodically worked, is shown by the following figures:—The aggregate product of gold in 1862 was 7275 ozs.; in 1863 it reached 14,001 ozs. 14 dwts. 17 grs.; in 1864 (for nine months only, ending Sept. 30), 14,565 ozs. 9 dwts. 8 grs.; in 1865 (twelve months, but ending Sept. 30, as do all subsequent years), 24,867 ozs. 5 dwts. 22 grs.; in 1866, 24,162 ozs. 4 dwts. 11 grs.; and in 1867 the amount has come up to 27,583 ozs. 6 dwts. 9 grs. We thus see that, with the exception of one year (1866), the product of every year since the commencement of mining very considerably exceeds that of any preceding year.

There is another mode of making calculations upon these statistics, which I am in the habit of using, as one showing much more conclusively the profitable character of gold mining in Nova Scotia. That is by showing the proportion which the aggregate gold product bears to the amount of labour expended in producing it. In this respect the Nova Scotian mines show an uninterrupted improvement, year by year. It was shown at the close of 1862 that, taking the product for that year of the mines of Nova Scotia as a whole, the rich with the comparatively poor, the successes with the failures, if there were any, it gave an average of gold to the man engaged in and about mining above, and very considerably above, that afforded by the mines of the province of Victoria, Australia. I cannot learn that the mines of Australia have materially improved in this respect; but in Nova Scotia this average yield per man has steadily and rapidly increased year by year, until now we find that, in five years, it has more than trebled. In 1867 the gold mines of Nova Scotia yielded a product at the rate of \$765, or 153l. sterling, to every man engaged, directly or indirectly, in mining. It may with safety be averred that the complete mining statistics of no other auriferous district extending over so great an expanse of country have ever shown so gratifying a result. The smallness of the aggregate product of the Nova Scotian mines for the period in question does not in the least detract from the importance of this average as an evidence of the richness of those mines. There is not the shadow of a reason to doubt that Nova Scotia, which in 1867 produced over 27,583 ozs. of gold, could, with a corresponding outlay of capital and labour, produce annually five, ten, or fifty times that quantity. As to this point, to which I shall again refer, every day's experience tends to confirm the statement just made.

The several specified mining districts have contributed in different proportions to this aggregate. They also show a wide difference, too, in their average yield of gold per man employed, and per ton of quartz. From these bold facts, however, I must warn the reader against jumping to any irrevocable conclusion as to the relative rich-

ness of these districts. The annual produce of a comparatively new, and yet very partially developed, gold field is no criterion from which to judge of its eventual productiveness. Again, some accidental circumstances may temporarily impede, or suspend, mining operations in a district, and, consequently, diminish its returns for a time, but without affecting its possible productiveness.

The district of *Renfrew* was the largest producer during the past year, having yielded 9401 ozs. 1 dwt. 17 grs. This is more than double the product of 1866, and more than ten times that of any preceding year. The improved result is owing simply to a greater development of previously known quartz lodes. *Sherbrooke*, the second in this respect, also shows a return much greater than that of any previous year. It amounted in 1867 to 8522 ozs. 8 dwts. 11 grs. This is equivalent to no less than \$1592.58, or 3187.10s. 3d. sterling, to every man employed in the district. But here, as at *Renfrew*, this increased product is not attributable to the opening of any new mines; it is the result of deeper sinking and more extended works in mines already in operation. It happens that no accidental circumstance has ever occurred to materially check the mining operations at *Sherbrooke*. Its history has been marked by a continuous and steady progress ever since the first discovery there. On the other hand, *Wine Harbour*, twelve miles distant, which for successive years took the lead of *Sherbrooke* as a productive district, shows a considerable falling off in its returns for 1867. This is to be attributed to the facts that a large portion of the property of the district has recently fallen into new hands, such transfers usually being attended by some suspension of operations until the new proprietors are prepared to resume them after their own method; and that the larger holders of the district have of late concentrated their efforts, in a great measure, upon a pretty extensive work, not productive in itself, but necessary to an enlargement of paying works. *Waverley*, which for several previous years was the largest producer of any district in the province, shows a falling off in its product, a fact which, I believe, may be mainly accounted for by the desire of miners to seek auriferous localities which would yield a larger net profit than that district. *Isaac's Harbour* gives nearly 50 per cent. more gold than in 1866. The return from *Oldham* for 1867 shows an increase of over 75 per cent. upon that of the preceding year. *Montagu* and *Tangier* have just about kept up their former reputation. In the latter district the most considerable works during the past year have been carried on in a part of the district known as "Old Tangier," from the fact that gold was there first discovered in Nova Scotia. Owing to the lack of a good road to this locality, which is about nine miles inland from *Tangier Harbour*, little has been done there until recently. This difficulty having been removed, and mining commenced in good earnest, the prospects of *Old Tangier* proved to be exceedingly promising. I saw, a few weeks since, about a peck measure of fragments of auriferous nuggety quartz, just extracted from a lode here, which in richness and brilliancy exceeded anything I have yet seen, and I think I have seen all the best specimens yet exhibited in Nova Scotia. The *Ovens*, which have been needlessly cried down of late years, afford but a small return, little mining having been done there. New proprietors have recently gone into this district, however, and are commencing vigorous operations, with fair prospects. *Uniache* is a comparatively new district, nothing worth the mention having been done there until 1867. Its prospects are exceedingly promising. Notwithstanding the amount of labour which is usually and almost necessarily misapplied groping in a new and unexplored district, *Uniache* shows a return of \$584, or 1167.16s. sterling, per year to every man at work in the district. Three quartz mills are in operation, and others are projected. As an evidence of the possibilities of this young district, I may mention that during the latter part of 1867 one of its mines produced gold at the rate of 1 oz. per day to each man employed.

New and to all appearance important discoveries are of frequent occurrence. Among the auriferous localities not already mentioned, and in which little or nothing has yet been done in the way of proper mining, I may mention *Gray's River*, where gold is found in a friable conglomerate, composed of materials from metamorphic hills in that vicinity; *Gold River*, near the head of *Mahone Bay*, North East River, near the head of *Margaret's Bay*, the hills skirting the southern bank of the *Stewiacke*; several places between the *Musquodoboit River*, and *Tangier*; the banks of the *Killae*, a branch of a river emptying into *Sheet Harbour*; *Seal Harbour*, near *Isaac's Harbour*, already mentioned; the shore of *Chedabucto Bay*; *Cranberry Head*, in *Yarmouth county*, the most western extremity of the province; and at its very opposite extreme, at *Wagamatkook*, *Victoria county*, in the island of *Cape Breton*. In most of these places the prospects are very promising, although in some of them extensive mining operations must be deferred until the action of the Provincial Government, or private enterprise, render them accessible by the construction of roads. This will not, in any instance, however, be a formidable undertaking, owing to the propinquity of all points of the gold-bearing formation of Nova Scotia to a sea coast abounding in good harbours, or to the travelled highways of the country, or both.

I omitted in the proper place to mention that *Lawrence Town*, where mining was commenced on a small scale in 1862, but has been languishing nearly ever since, seems quite recently to have entered upon a season of great prosperity. Some new discoveries have materially changed the popular estimate as to the richness of that district.

Before concluding this letter, I must make mention of one problem which will very materially suggest itself to the reader. I have already alluded to the propinquity of all points in the Nova Scotian gold fields to navigable water. In fact, throughout the whole of this province there is no point more remote than 30 miles from some good harbour upon the sea-board. The portion of this country supposed to be most highly auriferous, consisting of the belt of metamorphic rock extending along the Atlantic coast, is especially favoured in this way; although, owing to the broken and rugged surface of this part of the country and the dense forest with which much of it is covered, a very considerable outlay is requisite to render accessible any part of it, not already opened up by good roads. This is a matter which imperatively calls for, and will probably soon receive, the serious attention of the Provincial Government and Legislature. The construction of from 60 to 80 miles of road, in the counties of *Halifax* and *Guyborough* alone, would open up a very large tract of country, which is known, from actual exploration, to teem with auriferous deposits. Still, there is no dearth of rich, but as yet undeveloped, gold-bearing tracts which are easily accessible. We have seen that the quartz yet taken from the Nova Scotian mines yields a larger average product of gold than that of any other country. We have seen too that, on the average, any given quantity of gold can be, and is, extracted from the mine there at a much less expenditure of time and labour than in any other country. It may be added that, owing to the abundance of timber in the midst of the mining districts, mills, dwellings, and other necessary buildings can be erected at an almost nominal cost; and that all the necessities of life are cheaper than in almost any other part of the world where gold mining is carried on.

Considering all these facts, the reader may ask with wonder—Why is not more gold produced in Nova Scotia? and why do not more people engage in the occupation of mining? So far as the people of Nova Scotia are to be held answerable for this, an excuse is easily found in their lack of capital. In a new country like this, nearly every man has all the capital he can scrape up invested in his ordinary business. He will scarcely venture to divide it and his attention between two occupations, and few men of any considerable means have thought proper to close up a thriving business in order to invest their all in mining ventures. Nearly all the mines in Nova Scotia have been discovered, tested, opened, and the largest proportion of them are owned, by the working men of the country. The most of them carried into this business, in the first instance, but little except their strong arms and stout hearts, and when a majority of those interested in mines are of this class the progress in mining must be slow compared to the case where capital is freely invested.

It does seem curious that the gold mines of Nova Scotia have not attracted more capital from abroad. It would appear that most people labour under the hallucination that to engage in successful gold mining pursuits they must set out upon long and dangerous routes, to subject themselves to great toil, deprivation, and danger, in countries remote from the centres of civilisation. Accordingly we see people starting from the very doors of Nova Scotia to embark in gold mining in the Australian colonies, South America, and the coast of the Pacific, in none of which, as a rule, can that occupation be carried on as comfortably and as profitably as in Nova Scotia. I may

say that no capital from abroad worth mention is invested in the mines of this province, except some from the Northern States. A few men of enterprise and energy from that quarter have ascertained from personal examination something of the value of these mines, and have acted accordingly. They have been enabled to launch their several ventures with a capital sufficient for its requirements, and their efforts have been attended with great success. The relations between these strangers and the natives of this country are, and always have been, of the most amicable and satisfactory character; still, as is only natural to be supposed, most Nova Scotians would prefer to see Englishmen, with English capital, taking a place beside them in the gold fields.

When I speak of the importance of the intending gold miner carrying into his business a large amount of capital than most of those in Nova Scotia have been able to commence with, the uninitiated may be misled as to the amount requisite. Owing to the favourable circumstances already mentioned, and to the fact that most of the mines opened in Nova Scotia have been productive from the commencement, no very large amount of capital is indispensable. There are two modes by which the intending miner may become possessed of property. He may apply direct to the Crown for an unoccupied and unexplored tract upon some auriferous range. This he takes with all risks. It may prove to be exceedingly rich, or only moderately so, or possibly worthless. But to obtain this he pays to the Crown only 8s. sterling per acre of 250 feet by 150 feet—rather more than three-quarters of an acre, so his risk at the very worst is but small. Or he may buy out the right of another lessee to a tract which has already been explored, proved, and perhaps mined upon to some extent. Here, before purchase, he can satisfy himself by ocular evidence, and by examination of the sworn returns filed in the Mines Department, as to the auriferous productiveness of the property under consideration. In this case he may be said to run no risk at all, but, of course, he must expect to pay something approaching to an equivalent for the additional security. Such mining claims are frequently in the market, and I can unhesitatingly say are usually disposed of at prices so reasonable as to leave a very large margin for profit to the purchaser. This is to be accounted for by the fact that many men with small means take up claims, diligently "prospect" them, and find them to be very valuable; but by the time their explorations have reached a point where mining proper should commence they find their little capital exhausted. It is really better for them to sell out their interest for one-half or one-fourth its value than to undertake the struggle of mining themselves; and this is the course which they very often pursue.

The preliminary outlays, when the mining locality has once been secured, are very far from presenting a formidable appearance to a man of moderate capital. In such a wooded country as usually exists about the mines, rude but sufficiently comfortable dwellings for miners, shops, and other buildings can be erected very cheaply. A quartz mill may be put up and set in operation at a cost varying from 4000, sterling to 10000, sterling, according to the number of stamps used, to the locality where erected, and the driving power employed whether steam or water power. I may observe that such a mill as could be erected, in a not unfavourable situation for the last-named sum, would equal, if it did not exceed, the capacity of any quartz crusher now in operation in the province. All the necessary machinery, implements, and materials for the mining and treating of gold can be readily procured in the country at reasonable rates, manufactured by those who have studied and who understand the peculiar requirements of the business in Nova Scotia.

From these few statements the reader may be enabled to form a rough estimate of what is the minimum capital with which he could venture into gold mining speculations in this province. The abstracts of official statistics I have furnished will afford him some idea of the measure of success that might be expected from his venture. I could from personal knowledge cite many exciting instances of individual success; but this is not a fair way of putting such things before the public. I have given average results, made up with great care. The average annual yield of gold per ton of quartz per miner employed, &c., for the whole province, is the average of that return for a number of widely separated districts. Again, the average of each district for the year is the average of twelve months, averages. Consequently these averages of many averages afford a synopsis of mining results which is the fairest that is possibly attainable.

Halifax, Nova Scotia, Jan. 16.

PIERCE S. HAMILTON.

MINING IN CALIFORNIA.

SIR,—In my last note on mining in the above country I mentioned the *Soulsby Mine*, in *Tuolumne county*, which for a short period yielded over 45 lbs. of gold per week, and as the lode was chiefly composed of sulphurets, the sand or residue was rich. There are several other lodes worked more or less; I may name the *Buchanan*, *Deadwood*, *Raw Hide*, *Chapparel*, *Blakely*, and *Grizzly*; the two latter are the only ones that have been opened to any extent, and are situated near the *Tuolumne River*. The discovery of the latter is rather characteristic of the American, what I name a roving miner, with pick, tin dish, rifle, and a stock of provisions, goes prospecting for gold. In this case, being short of animal food, he sets his rifle for a grizzly bear; on examining the rifle in the morning, he finds that it has exploded, and following the bloody track of the animal hence the discovery of the quartz lode. Hearing of its being so rich, I examined it; at the surface it was certainly a splendid sight—the lode was over 4 ft. wide, and richly charged with visible gold; it did not contain as much sulphurets as the generality of quartz lodes; its bearing, north-east and south-west, with an easterly dip or underlie; the stratum a compact and highly crystalline gneiss, with curved and flexured lines of stratification, exhibiting distinctly the lines and layers of deposit, which evince its aqueous or sedimentary origin. Although so rich at the surface, a cross-cut or level was driven to intersect it: 30 ft. deep it was found to be small and poor, the rich rock at surface did not hold down, as is usually the case, the sulphurets had entirely disappeared. There are several plans of amalgamation, and almost every other miner has a different opinion on the subject; the simple rifle, blankets, copper plates, Chili mill, and Mexican arrastre are used, and it is doubtful if years hence the effectiveness of the first-named plan will be improved on.

There is a difference of opinion amongst miners on the mode of receiving the pulp or pulverised quartz upon them, some using one first, some the other. As regards the copper plate, properly prepared and attended to, I consider it the most effective amalgamation of all. The most simple machinery is best suited for quartz mining, and I would say to all engaged in it to avoid as much as possible patent machinery. By the copper plate can be taken up and retained gold of a fineness that no grain whatever is perceptible to the touch. In *Tuolumne county* there are several of these talcose deposits, from 20 to 60 ft. wide, which are generally charged with iron pyrites or sulphurets, which, of course, contain the gold. These, like the quartz lodes, may contain gold while the sulphurets continue. I perceive in the *Journal* that a company called the *Lincoln* is being formed for working a deposit of this kind in *Placer county*. It is very necessary for English or foreign capitalists to be cautious in investing in the mines on the Pacific coast, as generally speaking Americans want all the good mines for themselves. The celebrated *Almaden Mine* should be an example to all speculating in that country. Several years ago Mr. Black, then Attorney-General for the United States, remarked that the *Almaden Mines* were valued at \$25,000,000, and held, as he sarcastically said, by a parcel of foreigners. I need not say that it is well known that the company, after spending immense sums in law, &c., it was decided that the company had no legal title to the property. This was one of the so-called Spanish grants to which I shall refer to hereafter.

Norrtelja, Sweden, Jan. 26.

W. HOSKIN.

PESTARENA UNITED GOLD MINING COMPANY.

SIR,—I am obliged for the trouble you have taken in forwarding me the letter of Mr. Ludovico Lay, the late engineer of the company, which I herewith return, with the request that you will publish it in your next *Journal*. The peculiar circumstance of the writer offering to point out to an individual shareholder "the means of making the company's capital more secure and productive," after he has left the company's service, does not appear so indicative of integrity as could be wished; yet when statements are made those referred to should have an opportunity to reply. No doubt seems to be entertained as to the value of the mines, but there are inferences as to the manner in which the employees do their duty that should be answered by the chief officials. I deem it better to

publish the original than a translation, presuming that it will be more perfectly understood by those who have to answer it.

A SHAREHOLDER.

"Sie haben in der Nummer 16 Nov., 1867, vom 'The Mining Journal' einige Zweifel über die Goldbergwerke von Vallanzasca ausgedrückt. Leider muss ich solche bestätigen. Sie werden staunen wenn Sie von mir erfahren wie Leute im Dienste, die nicht nur überflüssig und nichts thun, sondern noch bei ihrem grossen Gehalte gegen die Interessen der Gesellschaft operiren; wie Massen von Erz verarbeitet werden dessen Transport schon mehr beträgt als das darin enthaltene Gold betet. Während meiner zweijährigen Wirksamkeit in diesen Minen unter der jetzigen Direktion, hatte ich Gelegenheit mehr kennen zu lernen als Ihnen lieb sein könnte zu erfahren. Die Direktion von der Unnützlichkeit der weiteren Vergrösserungen aufmerksam machend, war zu meinen eigenen Schaden, denn man entfernte mich um desto ungehinderter die Aktien im blinden Vertrauen zu lassen. Wenn Sie mir Ihre Adresse mittheilen er fahren Sie wie der wahre Stand der Dinge ist, und mit welchen Mitteln die Gesellschaft die ausgegebenen Kapitalien weit sicherer und nutzbringender machen könnte."

LUDWIG LAY, Ingenieur.

Intra (Lago Maggiore) Italien, Jan. 29."

COMMERCIAL AFFAIRS, AND THE MINING INTEREST.

SIR,—It is usual in the recognised organs of the various branches of commerce to notice at the opening of Parliament how far the probable acts and discussions of the session may influence the department of business which the paper represents. This was never more important, and seldom so important, as upon the present occasion. At no period within memory, at all events, had the proposals and discussions expected in Parliament, and the political and economical relations of the country generally, so large an influence upon the condition and prospects of business. Possibly in the parliamentary session of 1832 and 1848 an equal anxiety as to the state of public affairs may have existed, and on the eve of the repeal of the Corn Laws probably the expected conduct of Parliament had more effect before hand upon the money market and trade than is the case even now. Undoubtedly the state of public affairs in England, the vastly important subjects of debate in the session about to be held, the condition of Ireland, and the differences of opinion about it; our relations with the United States, the relations of foreign states to one another; and the general aspect of public and commercial affairs abroad, are such as to make investors cautious. There is a timid feeling among capitalists in the presence of the changes and agitations passing around us. The higher classes, the high middle classes, trustees of property, the landed interest, annuitants, and the clergy on both sides of the Tweed, and both sides of the Irish Sea, are alarmed at the tone of the public mind in other portions of the community; at the measures before this Parliament already, at the anti-English feeling in America at the uncertain policy of the French Emperor; and the certain designs of the Czar upon the integrity of the dominions of the Porte.

Now, Mr. Editor, Mining is as sensitive as any other industry, and more sensitive than most industries. The owners of mining property are greatly affected by the general apprehensions as to public affairs at home and abroad. It appears to me that any great improvement cannot be expected until there is something like a clear development of the course which Parliament will pursue; the policy of the Government on the Irish and American questions; the passing and effect of the new Act proposed in the Congress of the United States regarding naturalised citizens; the foreign policy of Napoleon III. as to the North German Confederation, Italy, and the East; and the plans and purposes of the Czar of the North. The reform debates stand first in order, until the three bills are finally disposed of, the return of courage to the investing public will be slow, nor will it, so far as that repressive influence is concerned, return until the character of the elections for the new Parliament of 1869 be demonstrated. Fenianism is checked and kept down, but it is nevertheless blatant, menacing, and spreading.

The Irish Church question has at last become, next to the Reform Bill, the great question of the day. The Protestants of Ireland are aided by their Presbyterian countrymen in a determined resistance to all ecclesiastical change. There has seldom been convened in Ireland a more numerous, and never a more influential, assembly than that which met this week in the Great Round Room of the Rotunda, in Dublin, and that meeting of Protestants enthusiastically resolved to oppose any alteration in the status of the Established Church. The proportion of the Irish Protestants is 14 to 4 Roman Catholics in the whole population of Ireland—three-eighths of the whole, and possessing far more intelligence and wealth, and a higher and more powerful political status. This agitation will prove to be one of the fiercest ever carried on, and must with large sections of investors possess a deterring influence. The Irish land question is also to be very seriously pressed upon this Parliament, and the landlords, all powerful as they are in both countries, will fight for the present relations of landlord and tenant, and even endeavour to make the positions of the latter less favourable by measures of ostensible reform, but practical reaction. When we look towards the United States, the horizon is troubled—electric clouds cast their shadows over the land, and seem ready to burst and let forth the bolts pent up within them. Some of these portentous clouds move eastward to the Atlantic, as if to flash their forked arrows against our shores. We must come to a better understanding with the United States, or as soon as reconstruction is accomplished war will be inevitable. Nothing in the world will affect our markets for shares, and our mining industry, more disastrously than the apprehension of war with the United States, unless, indeed, the breaking out of actual hostilities between us and our best customer.

The Abyssinian expedition is proving more costly than was estimated, and millions must be voted more than those estimates; this will effect the balance of income and expenditure, prevent the relaxation of taxation, and lead to fresh imposts, by which the prices of stocks, and trade, will be injured. The condition of foreign nations is such that large loans will be required, which will absorb our superfluous capital, in preference to mining or commercial enterprise, while the fear of war and revolution exists. France has issued a loan of 17,000,000, sterling, but it is believed that 40,000,000, more will be required. Saxony has issued a demand for a 4 per cent. loan of 8,000,000 thalers, in addition to the 5 per cent. loan of 6,000,000 thalers already obtained. Austria is unable to reorganise her army and navy without large credits. Money is so dear in Russia that its minimum rate is 8½ per cent., and yet the Government declares that money must be obtained to arm the troops with weapons of precision, and to lay down railways for strategic purposes. There is not a State in South America, except Paraguay, if, indeed, it be an exception, which does not require a loan. The treasuries of the Brazils, Argentine Confederation, and Banda Oriental are utterly exhausted, and they are unable to prosecute the war on the Parana.

At present there is a disposition to invest in foreign loans rather than in British, colonial, and foreign mining enterprise—a great mistake, for which many will pay dearly by the loss of money, which embarked in mining would have created wealth and spread industry around, making homes happy, and the hearts of the poor glad. If we could promptly quiet the minds of capitalists as to public affairs, trade and mining industry would brighten like the days of our already opening spring. The cotton trade has shown revival, the iron trade has become somewhat more active, a large amount of business in tin-plates has been transacted since last week closed, and the metal markets, which had last week hardened, are advancing satisfactorily.

This is a very favourable moment for persons of property to invest in progressive mines, as with peace there is every prospect of that kind of property rising in value. Stocks of all metals are very low in the United States, India, and Australia—our great markets. The home stocks are low, in consequence of the caution forced upon all by the state of trade and of the money market; so that with changes at home tranquilly and constitutionally effected, and peace preserved abroad, before the summer's sun ripens the fruit and the grain, and covers field and orchard with plenty, the sun of a revived prosperity will shine upon commerce, and more especially upon the long-suffering but most of all important business of mining.

Gresham House, London Feb. 6.

THOMAS SPARGO.

THE SLATE TRADE.—A valuable little pamphlet, containing the reprint from the *Mining Journal* of an interesting series of letters on "The Slate Trade in North Wales," by Mr. JOSEPH KELLOW, the well-known quarry engineer, has just been issued. The objects aimed at throughout the correspondence are—to show that an exhausted store of wealth remains undeveloped in the leading ranges of slate

rock in North Wales; that in order properly to apply the capital subscribed for opening up the hidden treasure it is of the utmost importance to secure thoroughly practical management; to show wherein the future can benefit from the experience of the past, by adopting measures agreeable to order and system throughout the stages of slate manufacture; and to point out the index by which every quarry undertaking of merit can not only be known but successfully and profitably worked; thereby demonstrating the fact that quarry enterprise is a road to wealth unequalled by any known channel of commerce. Such being the programme Mr. Kellow decided upon adopting, his long experience of over a century as a quarry engineer was ample to enable him to dispose of it satisfactorily in the twelve letters now reprinted. The letters contain information which will prove alike valuable to the practical quarryman and to those peculiarly interested, and the form in which they are now issued is a very convenient one.

SULPHUR, AND ITS REFINING.

BY CHARLES N. ELLIS, F.C.S.

Sulphur mines abound nearly all throughout Sicily, but as the Sicilians have neither roads nor railways, those only are worked, situated in the neighbourhood of a port—that is, in a radius of 40 miles—because the transport comes too dear. The transport is generally carried on with donkeys or mules as far as a high road, and then by small carts, which hold from 10 to 14 cwt., or direct to the port, the carriage of which costs from 1-8 tari per cantaro of 175 rotoli (=1.75 cantaro ordinary).

Sulphur mines are generally situated in the hills, being found and worked in the crudest manner possible. If, from indications of sulphurous water or other appearance, a man supposes there is sulphur, he begins to dig a hole. If he is successful in his search and finds sulphur, well and good; if not, he gives it up. Should he be successful, he hires a capomaestro (i.e., a master who has apprentices under him, or young workmen), a sort of small contractor, with some five or seven lads, who dig out the hole, and the boys carry away the thrown-out material in small baskets on their shoulders (containing from 20 to 40 lbs.). The ore is dug out, and when a sufficient quantity is thus obtained a ring of stone is first built, from 20 to 50 ft. in diameter and 10 ft. high, with a slanting floor. This is then filled up with a very high cone with ore. It is then thatched with earth outside. This is termed a "calcarone." It is then set fire to at the top, and burns downward. When it has burnt for about a fortnight they then tap it at the bottom, and let the sulphur run out into forms made of wood—rinsed out material in small baskets on their shoulders (containing from 20 to 40 lbs.). The ore is dug out, and when a sufficient quantity is thus obtained a ring of stone is first built, from 20 to 50 ft. in diameter and 10 ft. high, with a slanting floor. This is then filled up with a very high cone with ore. It is then thatched with earth outside. This is termed a "calcarone." It is then set fire to at the top, and burns downward. When it has burnt for about a fortnight they then tap it at the bottom, and let the sulphur run out into forms made of wood—rinsed out material in small baskets on their shoulders (containing from 20 to 40 lbs.).

Some mines there are with steam-pumps, which have seldom done well, for the following reasons:—

- 1.—The English drivers were drunken fellows.
- 2.—The proprietors would not sink shafts.
- 3.—If there is the least thing wrong in the machinery, repairs cannot be done on the spot. If sent for repairs to—much delay is caused by the dilatoriness of the foundry officials, and when the things do arrive they do not fit. They have then, at last, to send to England, consequently nearly a year's time is lost. But most of the mines are worked by people without means, who, of course, cannot afford to buy machinery, and who are very extraordinary in many respects. The water does not appear to rise from wells, springs, &c., but is chiefly caused by the heavy penetrating rains of winter. It is but rarely that mines can be bought, as nearly all the land belongs to nobles, who reside in Palermo, and who let their mines at the rate of from 15 to 45 per cent. of the produce.

Thus, as things are carried on, it requires but little capital; but with a good capital I am convinced a very good business would be done, so as to net not 10 to 20 per cent. of the cost, but the ordinary, but not the extraordinary.

Let us suppose a man with a capital of 1000, takes a mine, and engages some capomaestri with their boys; he pays them, perhaps, once a month, or more seldom, and according to the number of "casse" of ore they have worked out, he then at once sells sulphur for delivery, either at once, one, three, six, nine, or twelve months, and receives perhaps one-third, half, or the whole price, but of course suffers heavily, for the merchants won't lay out their money for nothing. The sulphur is then sold to the port, where there are stores which receive it, where the carriage is advanced, for which he pays again from 2 to 2½ per cent. in sulphur.

This is a brief sketch of how the Sicilians carry on sulphur mining. As a profitable investment I should recommend boring to ascertain where the greatest quantity of ore was to be found—if a mine not in work be obtained. A company with a capital of 20,000, with part paid up (or private firms for their own consumption in England, with a supply of 1000 tons), would be a very good one, at least for a commencement. The great thing would be to have pumps that do not easily get out of order. There should be a blacksmith's forge, with a fitter, a man who thoroughly understands the working of pumps, and could do all repairs when out of order, and a general manager who has a good general practical knowledge. Steam-engines of 10-horse power, or even less, where the work cannot be done by mules, I should think would be the best. The engines should be of such a kind that they can be easily transported and put together in any part of the mine, and that they can be used for any purpose. A mine with water should be transported to their destination on the backs of mules, depending entirely upon the situation of the mine; these things managed, all the rest is easy.

There are hundreds of mines ready for work, and there would certainly be a good dividend the end of the first year. Hear I should observe (Girgenti) that the mining goes on all the year round, but the burning only from the beginning of June, when the harvest in the neighbourhood is over, to the end of October, when the sowing season commences, and then there has to pay damages. A mine with water would be let at from 15 to 25 per cent. for a number of years. "Calcarone" are generally made from 200 to 600 "casse" of ore, and a "casse" weighs (more or less) about six tons, and produces from 12 cwt. to 16 cwt. of sulphur; the fusion of such a calcarone lasts about two months.

There are, of course, preliminary expenses, such as finding veins, building calcarone, making of passages or sinking shafts, engines, coal, &c. For other charges the following may be taken:—

Say, a mine producing 25,000 cantari (175 lbs. per cantaro)—about 1154 tons, at 15 cantari to the ton, would require for administration as follows:—	
One administrator, paid at the rate per annum	£75
One capo maestro (species of mining engineer)	40
One accountant	40
Two measurers, each 300, to 350	65
One policeman	25
The miners with their boys are paid according to the situation or richness of the mine, at the rate of 45 to 60 tari per casse (or even less, a taro = 4d.), but this includes all charges, as follows:—	
Administration	£240
2500 casse of ore, at 50 tari	2083
I assume for general expenses, such as finding, building calcarone, &c.	500—£2823

From 25,000 cantari deduct 25 cantari for the proprietor: this would leave 18,750 cantari, or worth 9 tari per cantaro; at the mines for best seconds, about 18 tari.

But, of course, one must make allowances for many other expenses, and for accidents, such as part of the mine falling in, &c., calculations differing at every mine, as also the qualities. There are, however, a mine or two which might be got close to the sea-side, which would produce 50,000 cantari of best seconds, where the sulphur could be embarked without charges, and might be got by good parties for 22 per cent. of the value, and no damages to pay. We are just, come to the neighbourhood. No doubt they would require pumps, but in other respects they are in working order. I have been informed that close to Girgenti there is a coal mine, or rather a mine of schist, containing a kind of tar (it smells like petroleum), which might be made useful with knowledge and means; it is not worked, and is close by a sulphur mine, which has water, and might be had cheap.

—Journal of the Society of Arts.

FOREIGN MINES.

WEST CANADA.—Capt. Plummer, Jan. 2: Huron Copper Bay: The slope west of Stephens's winze yields 2 tons per fathom, but the ore ground is short at this rate. The slope on the east side of this yields 2 tons.—Palmer's Shaft: The slope in the east, below the 20, yields 2½ tons. The slope east, below the 20, 8 tons; and below the 20, 2 tons. The slope on the west side of the shaft, where the ore yields about 2 tons per fathom. Bray's engine-shaft is going on with good dispatch, and is fast approaching a depth to be called the 60 ft. level. The ore is good. The ore in the 30, on the Fire Lode, yields from 1½ to 2 tons per fathom. We hope to hole this to Powell's winze in a short time, when we shall start a new slope. The slope east of Carmichael's winze has turned out pretty well of late, but is poor now, and we are not sure that we shall have to beat away dead ground at this point.—Wellington Mine: The slope west of Grenfell's shaft is stopped; the general average of the lode is too poor to pay for working at the present rate of copper ore. The lode in the 40, west of Cruise's shaft, is poor, but the ground has improved for driving. The lode in the winze below the 30, in advance of this, contains an average quantity of ore. The slope below the 24 yields 2 tons, and that below the 36, east of Mitchell's, 2 tons per fathom. The level going east of this does not yield so well. The slope east of Cooper's shaft is worth 2 tons, and on the west of Rowe's a similar quantity. This last slope is nearly completed, and we intend to commence sinking forthwith. I remark that as regards Wellington we have lessened the number of hands by stopping some of the poorer places, and have increased them at Copper Bay, where the slopes yield a larger quantity of copper.—Bruce Mines: We have just commenced to sink trial shaft, where the lode yields an average quantity of ore, and is promising. We do not intend to sink more than 3 fms. to increase the depth of slopes for the coming summer, and we sincerely trust the place will turn out well. The slopes below the 25 east yield about 2 tons, and above the level 1½ ton per fm. The 12, east of Taylor's, is not so good as when last reported, and the same may be said of the level going west, but there are indications of improvement in each direction. The result of December month's dressing is not yet known, but it will be smaller than for the previous month; first, on account of having to stop to repair the machinery, and secondly, on account of Christmas and New Year's holidays. Everything is being pushed forward to the utmost.

LUSITANIAN.—Jan. 28: Basto's Lode: At Taylor's engine-shaft, below the 110, the lode is worth 4 tons of ore per fathom. The lode in Rives's shaft, below the 90, is 2 ft. wide, composed of flookan.—Levels on Basto's Lode: The lode in the 110, east of Taylor's engine-shaft, produces 2 tons per fathom. In the 110, west of Taylor's, the lode yields 1 ton per fathom. The lode in the 60, west of Taylor's, on the south lode, is 4 ft. wide, composed of flookan, inter-mixed with country; at this point we have a small branch going off in the north side, which may be what we call Basto's lode, it being composed of flookan and a little stain of copper. The 100, east of Taylor's, is composed of flookan. The 90, east of Rives's shaft, contains stones of ore. The 70, east of Rives's shaft, is composed of quartz, flookan, and stones of ore. The 70, west of the slide, contains at times stones of lead and copper. The lode in the 38, west of Perez's shaft, is 8 in. wide, composed of flookan. In the 18, west of Perez's shaft, the lode is 6 in. wide, composed of quartz and flookan. The lode in the adit, west of Perez's

shaft, is worth ½ ton of ore per fathom.—Levels on the Caunter Lode: The lode in the 90, east of the slide, is 1½ ft. wide, composed of flookan. The lode in the 80, east of slide, is 4½ ft. wide; the north part is 1½ ft. wide, producing 1½ ton of ore per fathom.—Levels on Ponte Lode: The lode in the 28, east of the slide, is composed of quartz and spots of lead.—Level on Great Caunter Lode: The 60, west of Oak shaft, is composed of flookan.—Cross-Cuts: The 60, north of Rives's shaft, the 100 south of Taylor's, and the 28 south of Basto's lode, west of Rives's shaft, are each composed of a hard gneiss.—Winzer: In No. 67 winze, sinking below the 100, east of Taylor's, the lode is 3 ft. wide, composed of quartz and ore, worth ½ ton per fm. The lode in No. 65 winze, below the 50, yields stones of ore. The slopes on Basto's lode produce as follows:—Above the 18, west of Fonsaca's winze, ¾ ton of ore per fm. Above the 28, east and west of winze No. 58, 1 ton of ore per fm. Above the 80, east of Domingo's winze, ¾ ton of ore per fm. Above the 80, west of Domingo's winze, 1 ton per fm. Above the 80, east of Taylor's winze, ¾ ton per fm. Above the 20, east of incline shaft, the lode is 1½ foot wide, composed of quartz.—Stones on Great Lode: Above the 50, east of Taylor's, ¾ ton of ore per fm. Below the 38, east of Taylor's, ½ ton of ore per fm. Slide Lode: Below the 60 east, winze No. 66 is suspended. The slopes above the 110 east, winze No. 64 is worth 1½ ton of ore per fm.

Carvalho Mine.—Levels on Great Lode: The lode in the 40, east of incline shaft, is 3 feet wide, composed of quartz and munde, with stones of lead and blende. In the 40, west of incline shaft, the lode is 2 feet wide, composed of quartz and munde, with blende, worth ¾ ton per fm. The lode in the 30, east of incline shaft, is 4 feet wide, producing 2 tons of lead ore per fm. The lode in the 30, west of incline shaft, is 4 feet wide, being a mixture of quartz and country, with large quantities of munde. In the 20, east of incline shaft, the lode, which is 6 feet wide, is composed of quartz, and worth ¾ ton of lead ore per fm. The 10, east of incline shaft, and the 10, west of winze, east of incline shaft, are commuted. The eastern level will be continued east, and four men put to stop the back. In the 18 above the 20, east of incline shaft, the lode is 1½ foot wide, composed of quartz.—Stones on Great Lode: Above the 20, east of incline shaft, the lode is worth 1 ton per fm.; and above the 30, west winze No. 3, the lode produces ¾ ton per fm.

ROSSA GRANDE.—Mr. Ernest Hilleke reports, under date Dec. 30:—Since my arrival I have not found sufficient time to make a minute survey of the company's property previous to writing the full and detailed report called for in your letter of instructions to me; but, as regards the property, from the little opened on the lodes, and the auriferous nature of the first formation, I have every reason to hope that the company has a bright future in store. The jacotinga formation is distant three miles from the present works, and before any operations can be commenced thereon woods have to be cut down and a road made. I shall, however, be able to make a small force there next month, in order to test the auriferous nature of this formation. The produce cleaned up to the 24th inst., inclusive, is 9 lbs. 10 ozs. 7 dwts.—1026 ozt.; and the total for the month will be, I hope, about 1500 ozt. Force, in consequence of the accident at Morro Velho, is coming in fairly, but I am sorry to say I experience very great difficulty in finding accommodation—indeed, I fear I shall be under the necessity of refusing work to many able men on this account. Capt. B. Broken-shar took with him for delivery to Messrs. John Moore and Co. 15 lbs. 0 ozs. 14 dwts. of gold dust.

ANGLO-BRAZILIAN.—Capt. Thomas Treloar reports, under date of Jan. 2:—We are still straining every nerve to communicate to the old workings from Dawson's south. By extending the same we hope, in another month, to have now appeared in the line No. 4, and they have impoverished it, but to date we have not yet encountered the jacotinga in rising. A change is appearing in the lode at the Buraco Seco. We hope it will improve the yield in stamps. The extension of the deep adit towards the Fundao is being pushed on as quickly as possible. The lode in the end has a more inviting appearance than it had a month ago. Dawson's canoa and the lode at Haymen's present little change since my last.

DON PEDRO NORTH DEL REY.—Capt. T. Treloar, Jan. 2: Since my last advice our operations generally have not proceeded as satisfactorily as usual. The weather has been exceedingly changeable—rain, thunderstorms, cloudless skies, and a burning sun—and owing to this we have had an unusual amount of sickness, but no death has occurred. In addition to this the axle of Haymen's stamping mill failed, and having nearly a bunch of gold, the mill stopped for 10 days, and has thrown our produce back some 800 oitavas. The timber of the axle, when it was being worked up, seemed all that could be desired, but it could not have been sound throughout. The lines of gold Nos. 1 and 2 have not been wrought, but Nos. 3 and 4 have afforded poor vein stuff. The excavation on the line No. 3 is now down 21 fathoms below where it failed, and the line, vein, and surrounding jacotinga are changing. We may be mistaken, but we believe that we are again nearing a bunch of gold. The jacotinga have now appeared in the line No. 4, and they have impoverished it, but to date we have not yet encountered the jacotinga in rising. A change is appearing in the lode at the Buraco Seco. We hope it will improve the yield in stamps. The extension of the deep adit towards the Fundao is being pushed on as quickly as possible. The lode in the end has a more inviting appearance than it had a month ago. Dawson's canoa and the lode at Haymen's present little change since my last.

FOREIGN MINING AND METALLURGY.

The total imports of Belgian coal into France amounted in 1866 to 3,393,647 tons, while in 1867 they were only 3,014,451 tons, showing a diminution of 379,196 tons last year. The imports of Belgian coke into France in 1866 were also superior to those of 1867, having been 293,887 tons, against 232,982 tons, showing a reduction of 60,905 tons in 1867. The French Institution of Civil Engineers has had a discussion on the importance which the employment of foreign iron minerals is every day assuming in France. All the furnaces of the southern group, which comprises Corsica, consume the minerals of the island of Elba, Algeria, or Spain. The St. Louis Works, near Marseilles, set the example in 1855, and this example was followed by the blast-furnaces of Bassège, Alais, Terrenoire, Givors, Chasse, Vienne, and Creusot. The Allevard blast-furnace consumes not only iron minerals, but also the minerals of the island of Elba, Algeria, or Spain. The result of the large imports made of the superior minerals of the Mediterranean basin has been a considerable improvement in the quality of the pig made with coke, and its successful competition with the charcoal-made pig of the Comte and the Berry. The number of charcoal-worked furnaces in activity has sensibly diminished. The south-western group is of less importance as regards the qualities produced; the only great establishment of the district is either about to employ or does employ foreign minerals, the Agnès river works, in the Landes and Périgord districts, the number of which has diminished for some years past, supply their wants with the minerals of the Pyrenees and the Périgord, but their production is only a small part of the general make of France. For the rest, several of them employ rich manganeseiferous Spanish minerals from the Bidasoa and Somorostro. The blast-furnaces of Montluçon and Commentry which form the group of the Centre, consume a certain quantity of foreign minerals. The Franche Comté (in the eastern group) presents establishments which work with iron minerals, and both these consume minerals from Spain and the island of Elba. The introduction of foreign minerals into this group, and the delivery of pig manufactured with these minerals into the southern group, has occasioned a considerable fall in the price of the fine pig of the Comté, and the extinction of several charcoal-worked furnaces. To the north of the Comté group, the blast-furnaces of Dietrich and Co., in Alsace, consume the German minerals of Nassau and Slesgen. The Moselle group, in consequence of the iron minerals of the Moselle, and the blast-furnaces of the Meuse, the Meurthe, and the Haute-Marne consume only local minerals, and produce pig of ordinary quality. The works of the Ardennes and the Moselle employ foreign minerals from Belgium and the Luxembourg; but these minerals are almost similar to the local descriptions, and have not the effect of improving the quality of the pig produced. Those works which have obtained some reputation in respect to the improvement in their pig owe it to the employment of iron minerals from the Agnès river, the number of which has diminished for some years past, supply their wants with the minerals of the Pyrenees and the Périgord, but their production is only a small part of the general make of France. For the rest, several of them employ rich manganeseiferous Spanish minerals from the Bidasoa and Somorostro. The blast-furnaces of Montluçon and Commentry which form the group of the Centre, consume a certain quantity of foreign minerals. The Franche Comté (in the eastern group) presents establishments which work with iron minerals, and both these consume minerals from Spain and the island of Elba. 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Those works which have obtained some reputation in respect to the improvement in their pig owe it to the employment of iron minerals from the Agnès river, the number of which has diminished for some years past, supply their wants with the minerals of the Pyrenees and the Périgord, but their production is only a small part of the general make of France. For the rest, several of them employ rich manganeseiferous Spanish minerals from the Bidasoa and Somorostro.

While the exports of coal from Belgium have presented, on the contrary, a sensible augmentation. Thus these imports were 386,308 tons in the first eleven months of 1867 against 135,635 tons in the first eleven months of 1866, showing an increase last year of 250,673 tons. The imports of coke into Belgium have increased in a very marked degree, having risen from 2605 tons in the first eleven months of 1866 to 21,220 tons in the corresponding period of 1867. The imports of coke from Prussia form the largest share of these totals, the figures representing them being 1190 tons, and 20,163 tons respectively. The state of the Belgian coal trade is not considered to have improved; a milder temperature has sensibly diminished the demand for coal for domestic purposes, and as regards other qualities, they continue as neglected as for some time past. In the Charleroi district stocks now present some importance. At Liège the demand is not very great, and prices continue feeble. In the Conchaux deliveries, and there are considerable stocks, although the extraction has been restricted as much as possible; prices in this group are very feeble. The exports of minerals from Belgium amounted in the first eleven months of 1867 to 144,885 tons against 149,211 tons in the corresponding period of 1866, showing a diminution of 4266 tons last year; this reduction, however, is of no great importance, having regard to the general state of affairs. It is remarkable as a curious fact that while the exports of minerals to France increased last year to the extent of about 8000 tons, those to the Zollverein diminished to the extent of more than 9000 tons, yet the state of the blast-furnaces is worse in France than in Prussia. The exports of pig from Belgium presented a diminution to Nov. 30 last year of about 8200 tons, having been only 10,827 tons in the first eleven

months of 1867, while in the corresponding period of 1866 they were 14,009 tons. The exports of rails from Belgium showed a considerable augmentation last year, having risen from 62,734 tons in the first eleven months of 1866 to 76,967 tons in the corresponding period of 1867. This increase arose almost exclusively from the larger deliveries made to Russia of late; at the same time it may be remarked that the deliveries to Italy, which only amounted in the first eleven months of 1866 to 4799 tons, increased in the first eleven months of 1867 to 8166 tons. The exports of plates from Belgium declined from 15,406 tons in the first eleven months of 1866 to 11,714 tons in the first eleven months of 1867. The imports of minerals into Belgium amounted to 301,551 tons in the first eleven months of 1867, against 289,381 tons in the corresponding period of 1866; the augmentation arose especially in the minerals obtained from Prussian sources. As regards pig, the augmentation was more sensible, 50,143 tons having been imported in the first eleven months of last year, against 23,591 tons in the corresponding period of 1866. The imports of English pig to Nov. 30 last year were 45,260 tons, against 26,210 tons in the corresponding period of 1866; and of Prussian, 4172 tons against 2576 tons. Meetings are announced as follows:—Haut Flénu Colliery Company, Feb. 8, at Jemmapes; Falmucc Collieries Company, Feb. 11, at Gand; Haine St. Pierre Forges, Ironworks, and Foundries Company, Feb. 15, at Brussels; and United Collieries Company, Feb. 28, at Quaregnon.

Copper has been quiet of late at Havre; 10 tons of disposable have changed hands at 70l. 2s. 6d. per ton, Paris conditions; and 15 tons, to be delivered at the close of March, at 70l. 4s. per ton. The demand continues moderate on the Paris market; Chilean is quoted at 70l. 10s. to 71l., and Corocoro mineral at 73l. per ton. There has been no particular change in the tone of the article on the German markets; a little more firmness is remarked at Berlin and Cologne, but this has not been the case at Hamburg. Affairs in tin have again presented little activity at Amsterdam and Rotterdam, notwithstanding the efforts of holders, the tendency to a fall is still maintained. Since the sale of a lot of 800 blocks of Banca, effected at 32½, now, no affairs of any importance have been mentioned. The demand remains restricted on the German markets, and scarcely exceeds the current requirements of consumption. No affair worth mentioning has been indicated on the Paris market, Banca being quoted at 94l., Straits at 91l., and English at 91l. 4s. per ton. Lead has been only dealt in to meet the current requirements of the trade, and there has been no animation in transactions. The Breslau zinc market has been inactive; nevertheless, holders maintain former rates. At Paris prices have presented little change, rough Silesian making 21l., and zinc from other sources 20l. 8s. per ton.

A terrible colliery accident is reported from Essen. It occurred at the Neu Iserlohn Mine, situated between Langendreer and Dortmund. A shift of about 210 men were about to descend into the pit—indeed, upwards of 100 had actually gone down—when a dull detonation, followed by a thick cloud of dust and smoke, was heard. It was soon abundantly clear that a terrible explosion had occurred, and by nightfall 75 corpses had been drawn from the pit, a number subsequently increased to rather more than 80.

IMPROVED STEAM-ENGINE GOVERNOR.

Mr. Charles T. Porter, of Manchester, read a paper at the Institution of Mechanical Engineers on the "Allen Engine and Governor." In the construction of this engine the object aimed at has been to attain the greatest economy in expansive working, by having the full boiler pressure in the cylinder at the commencement of the stroke, with a sharp cut-off, avoiding reduction of the steam pressure by wire-drawing; although the slide-valve is worked with a direct continuous motion, instead of employing a liberating or disconnecting valve-gear. An invariable exhaust is also obtained, allowing the free discharge of the steam with all degrees of expansion. The engine admits of being worked regularly at the unusually high speed of 600 to 800 feet per minute speed of piston, and maintains complete steadiness of motion at this high speed; it also gives great uniformity in the driving power throughout the revolution, in consequence of the reciprocating parts being made to move at so high a speed that their inertia compensates for the high pressure at which the steam is admitted at the beginning of the stroke; while in the latter part of the stroke, when the steam pressure is diminished by expansion, the power previously imparted is given again in bringing the reciprocating parts to rest. The engine has a single horizontal steam cylinder, and works an air-pump direct from the piston-rod prolonged through the outer end of the cylinder. The steam valves have two separate slide-valves, one for each port, and both in equilibrium, worked with independent motions, so as to effect a sharp cut-off in each case, the motion of one valve being rapidly accelerated at the same time that the other is greatly retarded. The slide-valves are worked by a single eccentric on the crank-shaft of the engine, and the eccentric-rod is made with a curved slot on the inner side, corresponding to the ordinary expansion link; the two steam valves are worked from the sliding block in the slot, through the intervention of two bell-crank levers upon an intermediate rocking shaft; while the exhaust valves are worked direct from a fixed point at the outer end of the slot, and have thus an invariable travel, affording uniform freedom of exhaust, whatever degree of expansion is given by the link motion. The eccentric being set to correspond in position with the crank, without any lead, a correct valve motion is obtained, giving the same cut-off for each end of the cylinder. The position of the sliding block in the link-slot is adjusted by a lever from the governor, which thus controls the engine according to the work by regulating the grade of expansion, instead of by the ordinary means of a throttle-valve in the steam pipe. The air-pump consisted of a fixed box filled with water; in the lower part of the box a piston was attached to the piston rod of the steam cylinder; the inlet and outlet valves were all placed in the top cover of the box, and the plunger thus works always in solid water, as the air entering through the inlet valves from the condenser passes at once direct to the outlet valves, without becoming mixed with the water in which the plunger is working. The valves are India-rubber discs, guided upon centre spindles; and a light spiral spring is added on the back of each valve, to give the required promptness in closing, and to prevent the water from being driven back into the cylinder at the high speed at which the engine is worked. The governor has been designed by the writer as a modification of the ordinary Watt's centrifugal governor, for the purpose of increasing its sensitiveness and quickness of action. The balls are made very much lighter, so as to correspond with the much higher speed of revolution; and the connection of the radii rods to the centre spindle of the governor is made with forked ends, having a circular width of fork, and fitting upon a pin which passes through the centre of rotation, whereby the friction at the joints that oppose the rise and fall of the balls is reduced. The balls in rising pull up a heavy weight sliding on the centre spindle. In consequence of the increased sensitiveness obtained with this construction of governor, it is found to regulate the speed of the engine within a range of only 2 per cent. variation of speed under the extreme variations of load; and a variation of 5 per cent. in the speed would carry the governor through its entire range of action, and cut off the steam entirely from the cylinder. In practice the steam stop-valve is always set wide open, and the engine runs under all circumstances with complete steadiness and uniformity of motion, without requiring any attention. One of these engines was worked at the recent Paris Exhibition at the speed of 200 revolutions per minute, or 800 ft. per minute speed of piston; and other engines have also been running for some time at different works in Manchester, one at the above speed, and the others at 600 feet per minute.

INSTITUTION OF CIVIL ENGINEERS.—At the meeting of members on Tuesday, Mr. C. H. Gregory, President, in the chair, twenty-two candidates were duly elected, including, as Members, Mr. J. W. Barry, Westminster; Mr. J. Craigh, chief engineer to the Emperor of Morocco; Mr. C. H. Donham, district engineer on the Howrah district and Terminus, E. I. Railway; and Mr. David Reid Edgeworth, Dublin; and, as Associates, Mr. F. B. Behr, engineer to the Kaschau-Oderberg Railway, Pesh; Mr. Richard Broome, Thames Embankment Works; Mr. W. H. Cock, engineer of the Montevideo Gasworks; Mr. F. C. Danvers, Public Works Department, India Office; Mr. E. W. De Russel, Lewisham; Mr. G. W. Dixon, Wickham Market; Mr. W. F. Fawcett, Gutterford; Mr. A. F. J. Fisher, late India Valley Survey; Mr. J. H. Greenor, telegraphic engineer to the store department of the India Office; Capt. John T. Haverfield, R.M.L.I., Chatham; Capt. W. R. Johnson, M.S.C., Public Works Department, Bangalore; Mr. J. Ouchterlony Macdonald, G.I.P. Railway, Bombay; Mr. T. B. Nelson, Carlisle; Mr. A. R. C. Selwyn, Geologist to the Government of Victoria; Mr. L. H. Shirley, Cheltenham; Mr. A. T. Simpson, Westminster; Mr. H. E. Thornton, late resident engineer, Chichester and Midhurst Branch of the London, Brighton, and South Coast Railway; and Mr. T. Walker, Borough Surveyor, Rochdale. It was also announced that the council, acting under the provisions of Section IV. of the Bye Laws, had since the last announcement admitted Students of the Institution, J. H. Blake, J. Cash, R. Edmiston, M. Graham, E. Jones, J. V. Ley, M. K. Peto, W. H. Peto, C. E. Robinson, A. T. Smith, B. Stone, and F. N. Thorowgood.

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